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The American Standards Association is organized to provide systematic means of cooperation in establishing American Standards to the end that duplication of work and the promulgation of conflicting standards may be avoided; to serve as a clearing house for information on standardization work in the United States and foreign countries; to act as the authoritative American channel in international cooperation in standardization work

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Preparations Under Way for Taking Over Commercial Standards Activities

Following completion of preliminary arrangements for transferring most of the commercial standards and simplified practice work of the Bureau of Standards to the American Standards Association, active work is now under way for the permanent financing of the enlarged program. The first additions to the ASA staff to help maintain continuity of service in the project work have been made with the engagement of two members of the furloughed staff of the Bureau, George Schuster and Harry B. Houghton. For the time being they are making their headquarters at the Bureau.

The methods which have been followed by the Bureau in the simplification work and in the commercial standards work and the conference method of the ASA are now identical, with the exception that final approval by the ASA consists in a letter ballot of the Standards Council, while the Bureau's promulgation is by signature of the Secretary of Commerce and the Director of the Bureau of Standards. In each case, however, the decision is based upon acceptability to groups concerned, and not on the technical content. (The ASA has four other regular types of procedure, which are adapted to other conditions and to more complicated technical problems.) So far as feasible, conferences on projects will be attended by members of both the ASA staff and the Bureau's skeleton staff.

While many details of the cooperative relationships remain to be worked out, the ASA is thus prepared to follow through on both Simplification and Commercial Standard projects with complete continuity from any stage in which the project happens to be.

The ASA has decided that it is for the groups concerned with each standard to decide whether there is to be certification or labeling; and that any such program should be effectively supervised by a properly qualified body; e.g., a trade association, or a testing laboratory, operating under proper administrative management.

There is a strong trend in ASA work for the activities of closely related industries to become segregated in their respective fields, such as the electrical and the mining fields, with a large degree of autonomy. This trend is being accelerated by the transfer of work from the Bureau, and may result in setting up a dozen divisions of the work corresponding to the great groups of industry, such as textiles, ceramics and allied products, etc. In each case such groupings will be brought about through the action of the industries themselves.

The plans now being made call for the ultimate coordination of all national standardization work under the auspices of the American Standards Association, in line with the following announcement which was made by Secretary of Commerce Roper on July 19:

> "Actuated by economy requirements and the desire to place the responsibility for a unified national industrial standardization program in a single national organization representative of both governmental and private interests, arrangements have been completed to transfer certain of the commercial standardizing activities of the Bureau of Standards to the American Standards Association in New York.
>
> "The task of turning over this work of the Divisions of Simplified Practice, Building and Housing (work on the building and plumbing codes), Specifications, and Trade Standards, and the Section of Safety Standards, will be effected gradually under the direction of the Secretary of Commerce and the Director of the Bureau of Standards."

In accordance with this, the Bureau is maintaining a skeleton staff consisting of the five heads of the Divisions and Sections whose activities are involved in the transfer.

Washington Conference to Discuss Commercial Standards Transfer

A conference of representatives of industry, and of consumer groups, will be held at the Department of Commerce, Washington, on October 19, at 10 a. m., to discuss the cooperative relationships of the Bureau of Standards and the ASA in relation to the taking over of commercial standards and simplified practice work by the ASA. The meeting will be under the chairmanship of The Honorable John Dickinson, Assistant Secretary of Commerce. The speakers will include Secretary of Commerce Daniel C. Roper and President Howard Coonley of the American Standards Association.

Building Codes

by

George N. Thompson

This article introduces a symposium on the building and plumbing code situation in the United States. The articles that follow give a comprehensive picture of the plumbing code situation, review the code work of The National Board of Fire Underwriters, and describe the code activities of two outstanding regional building officials' groups.

Mr. Thompson's article is also the third in a series describing the activities being transferred from the Bureau of Standards to the American Standards Association. The author was formerly chief of the Building Code Section of the Bureau and as such was the staff officer for the Building Code Committee of the Department of Commerce.

So much is heard to-day about codes that it is probably just as well to define and simplify the building code problem at the start in order to make it stand out.

Stripped of the jargon of the lawyer and the engineer the building code becomes a document intended to prevent people from getting hurt. There is no other justification for it. Of course people can get hurt in various ways—by something falling on them, by being burned, or by contracting disease as a result of unsanitary conditions. All such contingencies have to be provided for, and they account for the ramifications of the code. Just so long as the code confines its requirements to this fundamental purpose of keeping people from getting hurt the courts will sustain it, for state and municipal authorities have the legal right under the police power to protect citizens from harm.

Building codes have very definite limitations, a fact that is not always realized. Many well meaning persons have the idea that through the medium of such codes superior construction may be made mandatory. Others with equal sincerity see in such codes a medium through which their own convictions, as yet unconfirmed by rigid investigation, may be imposed on the public. Equally well meaning, but fundamentally as wrong, is the tendency to perpetuate obsolete requirements that were conceived when knowledge of construction methods and materials was much more elementary than it is to-day.

Now consider the hundreds of different materials that are used in constructing buildings, the manifold characteristics, sizes, qualities, and so on that distinguish them one from another. Consider, too, that these materials are fabricated and put in place by all sorts of men of all sorts of degrees of skill and with mental attitudes affected by varying hormone secretions and states of digestion, and you have a subject of almost infinite variety to control. Obviously, some common sense method of treatment has to be worked out if the whole matter is not to become hopelessly complicated. Not so many years ago building codes were developing along the lines of intense detail, in a praiseworthy but hopeless attempt to foresee everything that might happen and provide appropriate safeguards. But the inexorable rush of progress threatened to swamp enforcement officials in such detail. Some way had to be found to bring order and simplicity into the picture and stop the process of continual accretion.

Fortunately the last dozen years have brought a partial answer in the development of standards for most of the materials in common use. This simplifies the problem tremendously. We can refer to a given material as meeting a named quality standard and this immediately fixes its characteristics. There is no need to go into wearisome detail. The problem in each case resolves itself into choosing a legal means of referring to such standards of quality and of providing a means by which revisions of the standards may be inserted with the least fuss and trouble. This in itself brings its own problems but it is vastly superior to older methods.

An even more important development has been a further change from minute specifications of what must be used to a shorter and more generalized form of statement in which results rather than means are specified. To say that four inches of concrete must be used around structural steel for fire proofing illustrates the old method. To replace this with a

statement that any covering that has demonstrated its ability to keep the steel functioning at full load for four hours under the standard fire test may seem a bit more cumbersome at first but brief examination will prove the contrary. You will notice that lists of materials, thicknesses, etc., may be at once eliminated. Attention is focussed properly on what is to be done. By far the most important consideration is, however, that as new materials and methods of protection come forward and demonstrate their fitness by standard tests they are automatically admitted to use with all the advantage of saving in cost that accrue to the consumer.

The reader will have sensed by now that the building code is a medium through which standards—standards of quality, standard methods of tests, and so on—may be correlated and made to function as a smoothly working piece of machinery in the interest of protection of the public. The code itself need not necessarily be a bulky document, for in many cases its function is to draw attention to existing standards rather than to reproduce them. It should, however, state clearly the general principles that must be observed so that a definite tie-up between expected results and a means of attaining them is effected.

There have been a number of agencies interested in the development of sound building requirements. Probably the most prominent has been the Department of Commerce Building Code Committee which, over a period of a dozen years has carried on continuous research and has issued recommendations from time to time. The theory underlying the establishment of this group was that a small body of professional men having continuous contact with governmental research laboratories and equipped to solicit suggestions on a nation-wide scale from building officials, national industries, and other contacts, would be able to make a distinct contribution toward bringing about better and more uniform requirements. That this expectation has been realized is evident from the use of its recommendations in the codes of more than 300 cities and in numerous state regulations. There is probably no code revision undertaken in cities of any size where the various reports of this committee are not studied. In its insistence on simplicity, emphasis on performance rather than details, and requirement of tests rather than claims as a basis for acceptance of materials and method of construction it has pointed out the main avenues of approach to a scientific treatment of the subject.

In this committee's recommended form of arrangement there are some 19 chapters for a complete code. A number of these subjects have been covered by committees of the American Standards Association which have developed standards or tentative standards of considerable length. Examples are the Elevator Code, the National Electrical Code, and the Building Exits Code.

Present code situation

The quest for greater uniformity in building regulations is complicated by varying state constitutional limitations, differences in traditional attitude toward such regulations, climatic and natural phenomena such as earthquakes, and different emphasis on the use of locally produced materials. Of course, on a purely theoretical basis, safety for the man in California should be on the same basis as for the man in Maine. Yet only a casual examination of codes in effect in different localities discloses rather large differences. The enthusiast for uniformity is apt to deplore this situation loudly and there are enough examples of absurdities to make a strong case against the present order. Yet the degree of divergence is probably not greatly different from a score of other subjects that are covered by varying state and municipal legislation. Closer study of the whole matter brings tolerance and much sympathetic understanding of why things are as they are. This does not mean, however, that there is not a large field for improvement.

Altogether there are about 1500 building codes in existence, of which perhaps not more than one-third are complete codes, the others ranging from simple fire-limit ordinances to documents of 300 or more closely printed pages. Many of them are unnecessarily severe. Many do contain absurdities. The code of a mountain city which once required that all piles be cut off below mean sea level and that of another municipality which demands the use of sperm oil for lighting in threatres come to mind. Such requirements are apt to stick in codes because of lethargy in revision. If there were more or less complete standards against which the local requirements could be checked with a minimum of effort and expense they would be more easily weeded out. Probably one of the best fields in which most useful work can be done, however, is the eliminating of unnecessary harsh restrictions, thus releasing savings now expended on unnecessary amounts of materials and converting them to productive use.

After-dinner speakers and writers are fond of estimating the possible savings through improvement in building codes. Some of these estimates are exaggerated and some probably reflect the hope that codes will be changed so as to present some special rather than general advantage. Yet changes such as that from 16,000 lb to 18,000 lb as the basic steel

stress are plainly conducive to savings of considerable magnitude.

Inasmuch as not all safety requirements are universally conceded as necessary, and the extent to which they should be applied calls for honest and sincere differences of opinion, it is clear that purely theoretical considerations are not enough. Study of practical experience over a period of years is good. Collection of statistics of accidents and loss of life with assignment of specific causes helps to provide a picture of the relative importance of various safety and health measures. Nor is the economic side to be ignored. Those who would arbitrarily forbid or limit the use of a certain material without comprehension of what it means to the industry concerned are taking an unbalanced view. Hundreds of millions of dollars may be invested in the industry. Thousands of workers may derive their livelihood from it. Taxes contributed, both local and national, may run into substantial amounts. It is, then, a task of considerable delicacy to set the limits within which such a material may safely be used. There should be strong and compelling reasons for the action taken.

On the other hand, manufacturers' claims are obviously not the criterion by which to judge whether the public is adequately protected. Here, again, is an instance where standards both of quality and test are woven intimately into the problem. With such standards to use as a guide, and with the composite judgment of qualified men to determine the needs and boundaries of safety requirements, all is done that is humanly possible to ensure fairness to all concerned. Without such standards, those who draw up codes will flounder around in a morass of opinion, with the danger that the most insistent and most vociferous will prevail.

There have been distinct contributions made in the building code field by organizations of building officials, fire underwriters, and material producers. As yet there remain considerable differences in requirements as between these several recommendations and marked differences of arrangement. Looking back over the last dozen years there is nevertheless a perceptible drawing together on general principles, a process which, if encouraged sufficiently, should result in wiping out a large number of existing variations.

Improvements in codes

Substantial improvements have been made. Required heavy wall thicknesses have been reduced in many cases. Allowable stresses in steel, concrete, and other materials have been brought more in line with tests and observed facts. A philosophy of fire protection based on the hazard of the contents rather than on empirical requirements has been developed. An immense amount of work on exit facilities for buildings has been done. Whatever advances have been made have been achieved as the result of cooperation, interchange of views, ability to see the other person's point of view, and relentless research that has piled up an accumulation of facts.

It is true, however, that the adoption of more rational requirements is a slow process. It lags well behind the production of new facts. Building codes, on the average, are revised at intervals of about seven years, although this interval is tending to shorten. In consequence, municipalities tend to require things that are obsolete. The problem of better requirements is not limited to their mere development and publication. It extends to educational and legal devices that will bring about reasonably prompt uses of information as it becomes available. Beyond this, too, lies the field of efficient and impartial administration of the code provisions. So the matter should be looked at broadly in its several phases if any real and substantial improvement is to be hoped for.

If the various attempts to produce more rational requirements are ever to be fused into one it is obvious that differences of opinion will have to be submerged in the common interest. There is a public interest here altogether different from trade agreements where safety and health are not involved. Painstaking consideration for the rights of those affected is just and proper but there comes a point where the test of public safety must be made and the results of this test must control. There have been too many conflagrations, too many instances of buildings collapsing, too many lives snuffed out through lack of adequate exit facilities. Beside these grim facts attempts at selfish advantage or stubborn differences of opinion take on a petty aspect. Surely there is a common ground where all can unite in pointing out those features that can be made substantially uniform. With the effective pioneer work that has been done and with the increased sense of social responsibility that is apparent in all phases of life to-day, there seems to be no reason why building requirements should not continue to show consistent improvement.

What has been said of building codes is true of plumbing codes. They vary to a truly remarkable extent. It is not at all uncommon for one city expressly to require something that a neighboring city forbids just as emphatically. In each case the local authorities are seeking to protect the health of their citizens. The trouble resides, however, in the fact that not enough is known of what takes place

in plumbing systems. Plumbing is just coming into its own as a science requiring just as intensive research as has been enjoyed by structural and mechanical engineering. Questions of the frequency of use of fixtures in various combinations, the proper sizing of pipes for complicated systems, and the effects produced by mixtures of air, water, and solids, demand intensive study.

The subcommittee on plumbing of the Department of Commerce Building Code Committee has stimulated a large amount of research work in this field and has issued recommendations that have been widely used. In a truly scientific spirit, however, it has pointed out that some of its conclusions are tentative pending the time when further and much needed experimental work is concluded. A number of university laboratories have also made exceedingly valuable contributions to knowledge of the subject. The American Society of Sanitary Engineering and the National Association of Master Plumbers have lent their encouragement to continuing research. With continuance of research and with development of standards for materials and test many matters that now lie in the field of opinion will be transferred to that of fact. Plumbing code requirements will then approach a much-to-be-desired degree of uniformity.

Summing up, building and plumbing codes would continue to have the benefit of disinterested efforts to preserve the gains that have been made and to carry forward further improvement.

The open mind, the scientific attitude, and old-fashioned common sense will do much to give the public the sort of protection it rightfully deserves.

The Plumbing Code Situation in the United States

by

William C. Groeniger,[1] *Chairman*
Sectional Committee on Standardization
of Plumbing Equipment

Plumbing codes have gained wide acceptance in American cities; standardization of codes and materials under way

The best way of gaining a true conception of plumbing is to recognize the qualities which render it valuable and make it supportable in law.

In order to clarify the situation, therefore, the discussion of plumbing codes will be prefaced by a brief statement covering the history and development of and the reasons for plumbing.

The delivery of water which is safe in quality and character, in sufficient quantity, and the speedy and safe removal of sewage (human excreta, urine, and household wastes) from places of human habitation and occupancy are the primary functions of a plumbing system. The kind, type, and design of fixtures, devices, and construction are of utmost importance in that they must provide for the delivery of a safe water, free from contamination, infection, and/or pollution, and the speedy removal of sewage.

Plumbing may be defined as the system of introducing water into buildings through water-supply distributing systems, and the removal of sewage and wastes through drainage systems.

Plumbing has three natural divisions:

1. Water-supply distributing systems
2. Drainage systems
3. Plumbing fixtures, apparatus, and devices

Plumbing provides for cleanliness of person, food, and habitation and permits the convenient and proper location of water-supply outlets, plumbing fixtures, and waste openings, without which the modern home, hospital, hotel, and skyscraper would be impossible. Life without plumbing in the modern city would be impractical. It has emancipated the

[1] Consulting Sanitary Engineer, Columbus, Ohio; representative on the sectional committee of the American Society of Sanitary Engineering.

human race, the woman in particular, from the drudgery of carrying water to and removing wastes from places of human habitation and occupancy.

Public water supplies in America date from 1652 at Boston. The first power pumps were used in Bethlehem, Pennsylvania, 1754 to 1761. In 1800 there were 17 water works in the United States, 34 in 1825, 100 in 1850, 243 in 1875, 1,000 in 1885, and 3,000 in 1895. From 1895 to 1933 the number of works has grown to more than 9,000, supplying more than 10,000 communities.

In addition to public water supplies, thousands of isolated institutions, colleges, schools, industrial plants, private estates, etc., have independent water systems, each supplying from a few hundred to many millions of gallons of water daily.

The three decades between 1901 and 1933 also saw the development of the small automatic water pumping unit which gave to the isolated residence or farm home continuous running water and eliminated the necessity of providing elevated tanks to store quantities of water by hand pump, wind mill, or other energy process.

Pumps and pumping machinery, pipes, and other material and apparatus were developed.

Water-borne disease bacteria were isolated in 1880, and the treatment of water by efficient and economical processes to make it safe for human consumption, has been perfected. The United States Government has set up a standard for safe water which is used by state and municipal health departments, bacteriologists, and chemists in this country.

Man's desire to have water available at convenient places made it necessary for him to devise methods for the disposal of wastes. This demand resulted in the sanitary, storm, and combination sewerage systems of today. The popular recognition that good sewerage is of value to public health, and that it is a municipal asset, had a strong influence in the development of sewerage systems and sewage treatment and disposal.

In addition to sewerage systems the small, compact, economical, and efficient sewage-treatment works have been developed to safeguard the source of water supply against pollution by sewage.

The plumbing system of a building is the connecting link between a water supply and sewerage system. The line where safe water supply ends and and sewage begins is sometimes very finely drawn.

The early history of plumbing regulation

Plumbing regulation is of English origin. History advises that the cholera epidemic in London, England, 1832-1854, was the beginning of the nuisance removal law and of the sanitary codes of modern times. The connection between a contaminated water supply and the cholera epidemic was clearly shown.

The abatement of nuisances by boards of health was the beginning of plumbing regulation in America. Many state laws give broad powers to boards of health, as follows:

> "The board of health shall abate or remove all nuisances within its jurisdiction. . . .
>
> "The board of health shall also regulate . . . the location, construction, and repairs of water closets, privies, sinks, plumbing drains, or other places where *offensive or dangerous substances or liquids* are or may accumulate. . . ." (98 v 188 O. L.)

The first plumbing regulations were promulgated for the reason that sewage is composed of human excreta, urine, and other domestic wastes (dangerous substances and liquids) which may contain harmful bacteria, and which, unless quickly and safely removed, are dangerous to life and health.

However, in 1908 a bacteriological examination of sewer air showing the absence of disease-producing bacteria, diverted attention from the real dangers of sewage and led many public health writers to argue that plumbing regulation from a public health standpoint was unnecessary. The fact that sewage contains disease-producing bacteria and that sewer air contains harmful gases was forgotten. This misconception of the basis for plumbing regulation did much to retard the adoption of plumbing codes, their administration as health measures, and the standardization of plumbing fixtures, devices, and construction.

That the report of the Subcommittee on Plumbing did much to correct this misconception is shown by the splendid progress that has been and is being made in both code and material standardization.

It is quite true that the first plumbing codes in America placed more importance on the removal of sewage and wastes from buildings than on the quality and control of the water or the water-supply distributing systems. It was generally accepted that the public or private water supply was good or bad. It was not uncommon for health departments to issue warnings regularly to boil all drinking water.

It required terrible epidemics and appalling losses of life to bring home to the people the fact that drinking water is one of the principal factors in the spread of certain diseases, the most important of which in this country is typhoid fever. Even after this was well established many cities continued to furnish water which was unsafe to drink and this resulted annually in a terrible toll of death and suffering from the ravages of typhoid fever and other

intestinal diseases. Twenty-five thousand people died annually from typhoid, with as many as two hundred thousand cases recorded in one year.

State and city departments of health, through their sanitary engineering and laboratory divisions, now have control and exercise vigilance over public water supplies, sewerage systems, sewage and sewage treatment, and disposal works. State and city bacteriologists and chemists make regular examinations of the water to insure its safety before it is pumped into the water mains.

For many years it was generally supposed that if the water was safe on leaving the pumping station or reservoir it would reach the consumer in the same condition. This theory is no longer supported by the facts. Water, after it leaves the pumping station, may be polluted, infected, or contaminated by connecting the main with an unsafe water supply or by cross connections in which sewage in plumbing fixtures, apparatus, or devices may flow by gravity or siphonage into the water-supply distributing system.

Plumbing Code standardization

In 1896 Ohio enacted a law giving the State board of health control of plumbing and plumbers. On the theory that the application of this law would constitute discrimination of persons the courts declared it invalid.

In 1908-1909 a survey conducted in Ohio showed that plumbing and drainage systems in public, semi-public, and other buildings were menaces to health. As the result of this study the State legislature enacted a law in 1910 creating the office of State inspector of plumbing under jurisdiction of the State board of health. (O. L. Vol. 101, page 395, Sections 1261-1-1261-15 G. C.)

One of the first duties of the State inspector of plumbing was to make a study of plumbing codes in Ohio. A study of ten cities' laws revealed many codes of rules and regulations widely at variance in their requirements. Recognizing the lack of uniformity in practice and the absence of standardization of fixtures, devices, and construction, the Seventy-Ninth General Assembly enacted a universal, minimum standard state plumbing code.

The enactment of this law had for its purpose the establishment of a minimum standard plumbing code for all classes and kinds of buildings in the State of Ohio. The penal sections, however, limited it to certain classes of buildings. For many years the Ohio State Plumbing Code was used as a model by states and cities and as a textbook for teaching plumbing.

Wisconsin followed Ohio closely in enacting laws controlling plumbing and plumbers. Wisconsin has carried on a program of plumbing education over a period of twenty years and leads all states in this work.

Many states, including Massachusetts, Illinois, Colorado, Indiana, Kentucky, North Carolina, Michigan, Minnesota, Maine, New York, Iowa, Florida, Virginia, and others, have adopted some form of rules regulating plumbers and plumbing. Some states' laws provide that cities may regulate plumbers, others provide detailed regulations but no administration. Still others provide for enforcement of regulations through the division of sanitary engineering of the State department of health.

Recommendations in the report of the Subcommittee on Plumbing point the way for states to adopt rules, and to regulate and control plumbers and plumbing.

In September, 1921, the Secretary of the Department of Commerce appointed a Subcommittee on Plumbing, of the Building Code Committee, to study plumbing and make such recommendations as might seem advisable after scientific investigation.

Through the hearty cooperation of the United States Bureau of Standards, arrangements were made to have two physicists assigned to the task, ample facilities being placed at the disposal of the committee.

For twelve years the Subcommittee on Plumbing has been studying plumbing codes; and it has issued recommendations in the form of a report published in 1924, revised in 1929, and again in 1931. This report has been made available to local committees and others interested in plumbing code requirements.

A survey in 1931 gave the following information:

82 cities have codes 20 years old, or older
104 cities have codes 15 to 20 years old
97 cities have codes 10 to 15 years old
210 cities have codes 5 to 10 years old
324 cities have codes less than 5 years old

There is no question but that the recommendations of the Subcommittee on Plumbing have played an important part in the adoption of plumbing codes by 324 cities within the last five years. Twenty or more states have utilized the recommendations of the plumbing report, either through direct laws or requirements drawn up by state authorities.

Since the publication of the committee's report, which includes suggestions for the adoption and administration of codes, it has become the guide for the adoption and enforcement of plumbing codes in the United States. The report is already in the third edition.

Through the distribution of the report of the

Subcommittee on Plumbing it has been possible to eliminate much of the prejudice, local pride, and indifference largely responsible for inconsistencies in plumbing codes.

The same code and general practices gained from tests and experiences are universally applicable to construction, materials, plumbers, contractors, inspectors, tests, etc. The same code and practices will work in any city or rural community or in any part of the United States. Good, practical, safe plumbing is the same for buildings regardless of geographical location, height, size, or kind.

The writer regards what has happened since the publication and distribution of the report as the most reassuring sign of progress in the plumbing industry that has appeared in 40 years. Too many people had been led to believe that plumbing regulations were but unfair methods to create work for journeymen, profits for the master plumber, excessive prices for materials, jobs for officials, and a means of stifling honest competition. Enemies of proper and legal health regulations did not hesitate to use such unfair statements to convince people that plumbing regulations were advocated for selfish purposes only. Such statements were often used to enlist opposition to the passage of sensible, reasonable plumbing laws.

Through the medium of the report of the Subcommittee on Plumbing, people recognize that plumbing regulation is for the protection of life and health and cannot legally give or maintain special privileges. The public interest in the report is a healthy sign that people recognize the health and economic necessity of controlling plumbing and plumbers.

Investigation has shown that in the absence of sanitary regulations and whenever each person is permitted to install a plumbing system according to his own ideas, insanitary conditions are sure to prevail. Discomfort, inconvenience, cost of repairs, foul odors, insanitary and unhealthful conditions are the resulting penalties which the occupant must pay.

The American Society of Sanitary Engineering in 1906 set up as one of its special objects the adoption of a minimum standard plumbing code and the standardization of materials. This Society has encouraged the use of proper methods and materials to accomplish this end. This the members have done by experimentation, scientific research, and dissemination of the knowledge gained from experience.

A forward step in standardization was made in June, 1933, when the National Association of Master Plumbers approved a detailed plumbing code recommended by its Standardization Committee. The writer has not had an opportunity to read this code but from one who has comes the information that with few exceptions it follows the report of the Subcommittee on Plumbing.

In the last 25 years the various associations connected with the industry, together with engineers, architects, manufacturers of plumbing supplies, contractors, and governmental authorities have made an effort to have code standardization brought about in some way, but failed. The wide variation of existing codes, together with the highly differentiated nature of the industry, has made code standardization a slow process. There are items of code standardization which affect more than one branch of the industry and this requires very broad cooperation.

It was evident that no satisfactory standardization or simplification could be effected unless the parties to the agreement included not only manufacturers but federal, state, and municipal authorities, architects, engineers, plumbers, and the representatives of owners of buildings.

It is reasonable to believe that if there is no variance in plumbing regulations it would be a relatively easy matter for the different associations representing the industry to get together and adopt standards, but if these same associations and industry are faced with rules which vary widely in different parts of the country it would be impossible for the parties interested to agree.

All technical and engineering societies, trade associations, manufacturers, and owners now appear to agree that a universal, minimum standard plumbing code in the United States is just as sensible and practical as the standardization of our language, currency, and the gauge of railroads, threads of bolts and nuts, rubber tires, and other matters which have stood for simplicity and economy.

Standardization of Plumbing Materials

The report of the Subcommittee on Plumbing recommends simplification and standardization of plumbing materials and suggests that those interested take advantage of the facilities which at the time the report was completed were being extended by the United States Department of Commerce.[2]

> "In the committee's judgment the basis of standardization must be the standard plumbing rule or the plumbing code as it is commonly called."

It is true that standard plumbing rules and standardization and simplification of plumbing materials are interdependent. The basis suggested by this rule

[2] These activities of the Department of Commerce are now being taken over by the American Standards Association.

is also applicable to standardization and simplification of materials, performance specifications, etc. In other words, to set up a true standard there can be no conflict or inconsistency between the plumbing code and the material, fixtures, devices, or construction. The basic plumbing principles are a guide to the standard plumbing code.

When and if scientific study indicates that the detail in construction, such as pipe sizes, material, methods of construction, etc., is antiquated or in error the detailed code should be revised and amended. Standard specifications should not conflict with the detailed code requirements.

Authorized by the American Standards Association and sponsored jointly by the American Society of Sanitary Engineering and the American Society of Mechanical Engineers, the Sectional Committee on the Standardization of Plumbing Equipment was organized in November, 1928. The scope of this undertaking is as follows:

> "Standardization of plumbing equipment including materials, uniformity of roughing-in dimensions, efficiency of operation, and other performance specifications."

At the organization meeting, stress was placed on the importance of the nationwide adoption of minimum standard plumbing regulations, such as the set of minimum requirements proposed by the Subcommittee on Plumbing, Department of Commerce Building Code Committee.

It was recommended and agreed that the committee accept all projects included within its scope previously undertaken by the Bureau of Standards and its Division of Simplified Practice. Standing committees for each of these projects were recognized as Subcommittees 1, 2, 3, and 4 of the new sectional committee, as follows: Subcommittee 1, Plumbing Code Requirements; Subcommittee 2, Staple Vitreous China Plumbing Fixtures; Subcommittee 3, Staple Porcelain (All Clay) Plumbing Fixtures; and Subcommittee 4, Enameled Sanitary Ware. Subcommittee 5 undertook standardization of Waste Traps, and the Standing Committee on Brass Lavatory and Sink Traps was designated as a subgroup of this committee. Subcommittee 6 was appointed to undertake standardization of Brass Plumbing Products.

To the subcommittees of the original set-up have been added Subcommittee 7, Copper Water Tube Fittings, and Subcommittee 8, Cast-Iron Soil Pipe and Fittings.

During the five years since the inception of this committee much has been accomplished in the field of standardization. The report, "Recommended Minimum Requirements for Plumbing," of the Subcommittee on Plumbing (Subcommittee 1) has been revised a second time (1931); the Standing Committee on Staple Vitreous China Plumbing Fixtures, Division of Trade Standards (Subcommittee 2) has issued "Staple Vitreous China Plumbing Fixtures" (a revision of Simplified Practice Recommendation No. 52)[3]; Subcommittees 5 and 7 have submitted their reports which will soon be ready for distribution; and Subcommittee 8 is working on an advanced draft of its report.

Scientific investigation

In 1929 the Subcommittee on Plumbing, cooperating with the Bureau of Standards, outlined a program for plumbing investigation. This program included the erection of a tower at the Bureau of Standards in Washington, for the primary purpose of providing data for the subcommittee, as follows:

1. Data on the capacity of drainage systems in buildings under actual conditions of plumbing installation.
2. Data on maximum loads which occur in drainage installations in buildings.
3. Data on sizes and types of vents necessary to protect trap seals and eliminate air pressures in drainage systems.
4. Application of the data in a practical manner to the plumbing code requirements.

In September, 1931, the tower was completed, tank and equipment installed and preliminary experiments had been started.

The government economy program has necessitated the curtailment of this scientific investigation. It is likely that the future progress of this work will depend upon the availability of funds. Some arrangement should be worked out to carry on these investigations. In 1930 several leading manufacturers of plumbing materials, the American Society of Sanitary Engineering, trade press, and others contributed $3200 in cash, in addition to materials. It would seem ethical to send invitations to those interested in participating in this work to contribute funds to the National Research Council to be allocated for this purpose.

Much progress has already been made by the Bureau of Standards and the data will undoubtedly prove of untold value to people of this country.

Summary

Starting with the fundamental principle that plumbing regulations are applications of police power to protect persons against injury to health, the following ideas must be kept steadily in mind:

[3] Commercial Standard No. 20-30.

1. The finest system of plumbing in the world will not make a building safe but will insure persons who occupy the structure that certain health factors have been provided.
2. Plumbing in a building is not installed for safety of the structure but for the health, comfort, and convenience of occupants.
3. Any plumbing regulations having to do with a code of rules, the administration of said rules and/or the licensing and examination of plumbers are applications of police power in the interest of health.
4. The report of the Subcommittee on Plumbing, including detailed code, allocates plumbing to a health and not a building department.
5. Plumbing is regulated and controlled to protect persons against injury to health. The health factor of safety is the minimum requirement and it should never be lowered for any economic reasons.
6. A plumbing code may not legally prescribe benefits. The provisions of a code are the minimum requirements and not the maximum permitted. The owner may use his own judgment in the selection of a standard of plumbing higher than is needed to safeguard health.
7. There is a difference between conferring a benefit and preventing an injury to health. Standardization of dimensions, standardization of symbols and standardization of materials are for economic benefit and not for protection against injury to health but may be brought about by agreement and concerted action.
8. The health factor of safety is fixed and cannot be reduced. Water is either safe or unsafe. Sewage-polluted water is unsafe. Plumbing may be rated as either good or bad. The minimum standard rule is as low as one may go in safety.
9. It is evident that no satisfactory standardization or simplification can be effected without a minimum standard plumbing code as the basis. Plumbing codes and standardization and simplification of materials are interdependent and cannot be divorced.

The National Board of Fire Underwriters' Proposed Uniform Building Code

by

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Work on building codes, started in 1905, has been accompanied by education on need for sound construction

The preparation by the National Board of Fire Underwriters in 1905 of a building code designed to secure uniform building laws throughout the country reflected the belief that good construction should be recognized as of the utmost importance in every city and town. This association of stock fire insurance companies had been interested since 1866 in the direction of fire prevention, improvement in building construction, collection of fire statistics, and suppression of arson. Since that time distribution has been made to the public of a vast amount of information gained from intensive studies of numerous subjects. It realized that one of the most serious problems confronting all cities and towns is situable protection from devastation by conflagration. When a fire reaches such proportions that it wipes out whole blocks of buildings it becomes a public calamity; it not only ruins individual citizens, but may paralyze the industrial progress of a community for years.

At the time of preparation, the safeguarding of lives against such dire calamities as the destruction of the Iroquois Theatre in Chicago in 1903, where nearly 600 people perished, was much in mind, as well as the economic necessity for the reduction of the appalling loss of property by fire—in addition to alarming waste, fire loss was increasing each year.

Principles of codes

The Code, prepared by the Board's Committee on Construction of Buildings, was based on broad principles, which were sufficiently amplified to provide for varying local conditions in towns as well as in cities. It was intended that the evolution of building construction and the introduction of new materials and practices should be closely followed and, in revised editions, to suggest to the public the newest and safest methods of construction. The committee was assisted in this work by experts of the highest authority in the art of building construction, valuable help being rendered especially by John Stephen Sewell, Captain, Corps of Engineers, U. S. Army.

There was an undertaking to arouse municipal authorities everywhere to a realizing sense of the grave responsibility that rested upon them to enact and enforce adequate building laws for the protection of life and property. The mayors of cities of 5,000 population and over were addressed, and copies of the National Board's Building Code were sent them. The Code was everywhere well received, and, in many instances, advices were received that building laws were being prepared, using it as a guide. Following this, the chief engineers of the fire departments of the country were similarly addressed. A paper on the subject presented at the Chiefs' Convention in 1906 evoked much interest. Insurance company executives and special agents of the companies were asked to support municipal authorities in efforts to secure the needed reforms in building laws, as well as to place themselves on record as favoring that action.

Changes in code

After the publication of the first issue the Code passed through three editions, and over 30,000 copies were distributed to the public. At the same time the art of building construction advanced with remarkable rapidity. Materials employed and methods of use changed radically in certain directions, making a complete revision of the Code a necessity in 1915. This was made by Ira H. Woolson, who had been Consulting Engineer to the Committee on Construction of Buildings since 1910. He previously was Adjunct Professor of Mechanical and Civil Engineering at Columbia University, and the University's official testing engineer for fireproof materials, founding that institution's laboratories. Later he was chairman of the Building Code Committee of the Department of Commerce. The Fourth Edition contained several new features. One was the use of numerous notes scattered through the text, serving either as recommendations, caution, or explanation. The second was the introduction of cuts illustrating details of construction, and the other was the use of frequent cross-references in the text as an aid in quickly finding allied subjects. The object of the changes was to make the Code a guide or textbook for the use of commissions engaged in drafting building ordinances and designed to cover all the essential features of construction which such a commission would be likely to discuss. Appendix matter was added. This was explanatory or educational in character and believed to be useful for those in charge of construction work under the requirements of the Code. It was left to the different city authorities to decide whether or not to include the various items in the subject matter of the Code proper.

Many good-sized municipalities in every state in the Union made use of this edition in the framing or revision of its building regulations. Some adopted it practically in its entirety or used considerable portions of it. Atlanta, Georgia; Davenport, Iowa; Nashville, Tennessee; and Tacoma, Washington are representative cities which did this. The edition passed through a number of reprints, some of them including alterations in the text.

In order that it should be representative of progressive practice and reflect the latest information affecting building construction, a revision was undertaken in 1929, the result being the publication of the Fifth Edition in 1931. The formulation of the text was the immediate effort of Rudolph P. Miller, a particularly well-qualified consultant on the subject. In addition, whole-hearted cooperation in the way of suggestions as to the treatment of many features was received from national organizations interested in the production and distribution of different building materials. Similar cooperation was extended by representatives of the fire insurance business. The accumulated evidence secured from these sources was very beneficial.

In arrangement, the Fifth Edition follows generally the recommendations of the Building Code Committee of the United States Department of Commerce, as outlined in that Committee's report of 1925. In developing that arrangement, the Committee distributed 1,000 copies of the tentative report for criticism and discussion to architects, engineers, and others who were presumed to be competent to offer helpful service. The returns from that appeal were generous and were considered by the committee in the preparation of its final report. That constitutes a strong background for the use of the arrangement for the National Board's Code.

Standards used in code

Detailed requirements have been avoided whenever possible. On the other hand, realizing that ade-

quate facilities for enforcement are not always provided by municipalities, and that a large percentage of building operations are still in the hands of designers and builders who are not qualified to apply the ordinary accepted principles of construction, the general requirements are supplemented by provisions indicating certain materials and methods as satisfactory. Believing it to be advantageous for a building code, use has been made of the standard requirements adopted by various societies rather than separate specifications written out in full. A great saving in the bulk of a code is not only effected thereby but producers of material are saved many annoyances, and builders avoid the expense of many tests and other investigations in order to establish the suitability of a given material for use in any city. It seems too plain for argument that the sensible thing is for cities to adopt the standard specifications for steel, cement, brick, and other building materials issued by the American Society for Testing Materials.

Favorable comment on the text of the edition as prepared for publication was received from reviewers of it. Robert D. Kohn, New York City, then president of the American Institute of Architects, stated: "I have nothing but admiration for the thoroughness with which this Code has been prepared." William K. Hatt, chairman of the Building Code Committee, U. S. Department of Commerce and Professor of Civil Engineering at Purdue University, Lafayette, Ind., commented in part: "It follows very closely the recommendations of the Building Code Committee of the Department of Commerce in those matters upon which the Building Code Committee has drafted recommendations. The Building Code of the National Board of Fire Underwriters appears to me to be drafted in the public interest and can be recommended for adoption by all municipalities." Charles Derleth, Jr., Professor of Civil Engineering and Dean of the College of Engineering at the University of California, had found earlier editions of the Code instructive for students and had used them as a text for twenty years in advanced courses in structural engineering at the University. His comments include the statement that "It is with pleasure that I endorse the Building Code, Fifth Edition, 1931, as recommended by the National Board of Fire Underwriters." He was confident that much good would result where a municipality took advantage of this Code, making only such changes as local necessity might dictate, interpreting the instrument always by a competent and sufficiently manned bureau of inspection. Other well-qualified commentators have stated that the document as published—"is a very commendable and splendid piece of work," and "We believe that you have produced a book which should be in the hands of every architect and designing engineer and certainly in the hands of all building officials and building code committees."

Reception of code

The reception of this edition has been cordial. Building officials, civic organizations, local code committees, special consultants, and others having the preparation or revision of building codes at interest have attested to its worth as a guide for their communities. The authorities in a number of important cities and towns have indicated their intention to make it the basis for new or revised regulations in their municipalities. A number have used the edition practically as it stands for codes which have been enacted or proposed. About 9,000 copies of the 1931 Code have been distributed to date to the public and to educational institutions, on request.

The material in the Appendix is explanatory in character and treats 18 different subjects. The Standard Fire Test is given in full. Suggested ordinance text for some items, such as powers, duties and requirements covering administration features of building law, is set forth, for use as may be decided upon by the framers of individual building codes. Wind pressures, earthquakes, protection against termites, and construction of theatre curtains are some of the things discussed.

The service which the National Board renders to municipalities in connection with their building regulations is not, however, limited to the distribution of the Code, but includes consultation with local committees charged with the revision of building regulations, a review of their proposed codes, and comment upon their suggestions which, if accepted, will bring their codes into harmony with the Building Code of the National Board of Fire Underwriters.

The Code is used as a textbook in numerous colleges and other educational institutions, in courses in architecture, engineering, and building construction. About 50 such institutions are using it at the present time, mainly distributed about the United States, as well as in Canada and Alaska. A professor of architecture states that the Code seems to be in much better shape for use as a textbook than was the old edition; also, he believes that it contributes a great deal to the practical teaching of building construction problems. A professor of civil engineering writes that his students are using the Code as a textbook in courses, and "are given to understand that practically the best and latest thought of building codes is embodied in this book of yours."

Building Code Developments on the Pacific Coast

by

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Pacific Coast Building Officials' Conference

Building Officials' Conference provides regularly revised standard codes, information on materials and construction, and research

Uniformity and correctness of standards of construction involving standards for materials, methods of assembly, standards of safety, both fire and structural, have been the basis of past activities of the Pacific Coast Building Officials' Conference. It has been the purpose of the Conference to bring together the most authoritative data, to eliminate the bias of salesmanship and political influence, and to add to this the necessary sifting based on "minimum requirements" determined by years of experience in actual building law enforcement; from this combination to evolve a code that will promote, fairly and correctly, the use of all recognized building materials in their proper place and insure to the building owner the maximum of building for his money, based on safety over a reasonable use-life. The success of the efforts of the Conference is evidenced by the fact that the "Uniform Building Code" as compiled by it, has been adopted to date in 121 cities and 4 counties. At least two other conferences have used the Conference "Uniform Building Code" as a basis for compiling their codes, and many other cities have used the code as a basis for revision and modernization of existing codes.

The Pacific Coast Building Officials' Conference was organized in 1922, by a few building inspectors, who had vision and ambition to improve both themselves personally and the efficiency of their departments. It was soon found that there was such a wide variance in code provisions that there was no common ground for discussions. Also, the existing codes were incomplete and either too stringent or too lax on the subjects covered. In 1925, the Conference started energetically to compile a "Uniform Building Code." This code has, to date, gone through three editions, each of which is a modernization of the previous one. Editions are published not oftener than every three years. The fourth, or 1934, edition will be off the press sometime during the first part of 1934.

The grades and privileges of membership in the Conference may be compared to a wheel in which the hub, or active membership, is composed of building inspectors, holding exclusively the voting and office-holding privileges. Around this hub are assembled the professional, associate, and subscribing grades of membership. All members have equal voice in code matters up to the point of final vote. This arrangement is made in order to insure fairness to all materials. A grade of active participating membership is open to cities wishing to avail themselves of a full code consulting service.

Building inspectors have, in the past, for the most part been considered an unimportant part of municipal government; their position one that could be held by anyone who had ever seen a building in the process of construction, particularly if he had any political influence in the community. Ordinances, compiled by individual men, have been passed which were based on one man's pet ideas of good construction. Many of these ordinances proved to be unenforceable; with the result that the city council would therefore be forced to grant special permits, or the building inspector would wink at that portion of the code which proved objectionable. Engineers and architects have, for the most part, not been interested in the compilation of codes, or have considered it below their dignity to become interested in the building inspectors' problems, and have allowed ordinances to be passed, which were the result of super-salesmanship and political influence, and which did not take into consideration the best interests of the ultimate building owner or the safety of the public.

The Pacific Coast Building Officials' Conference makes available to the building inspector the most authoritative information on building materials and construction. Special information is disseminated to members through mimeographed communications, and through the monthly publication *The Conference Bulletin*. With this in hand, and with their education and experience in code enforcement, they compile or bring up to date code provisions using the valuable research data and knowledge furnished by various material groups, together with the education

and experience of architects and engineers. With this method, the Conference has available the best thought on all lines. The open forum discussions prevent biased provisions getting into the code and also prove to the various material groups that their material is given fair consideration.

Research department

In order for a city adequately to maintain a research department, to pass properly upon new materials and types of construction, and to keep the code up to date, it would be necessary to expend not less than $10,000 per year. This outlay is out of the question for all but the largest cities. The building inspector members of the Pacific Coast Building Officials' Conference have accomplished this by coordinated effort and sharing of expense so that there is no burden on any single city and all have the benefit of an up-to-date research and code maintenance department.

The Research Department of the Conference was organized to pass upon new materials and type of construction which are continually coming before the building inspector for consideration. This department is composed of nine men evenly distributed the full length of the Pacific Coast. All the work of this department is carried on through the Conference Headquarters. If, upon the presentation of a material, there is no specification already set up in the code, a specification is first set up. Then the necessary tests are conducted under the direction and supervision of the department and the decisions are rendered, based on test findings. This department gives to the building inspector an unbiased source of information free from the influence of politics and salesmanship.

Building code compilation and maintenance have heretofore been considered a relatively unimportant task; one that could be satisfactorily accomplished by any tradesman familiar with building construction. The fact is gradually being understood that code work is of utmost economic importance to a city and is not a one-man job regardless of the ability of that man. A code to be correct must be the result of coordinated effort of specialists in all branches of the building industry, taking into consideration, in an unbiased manner, the use and adaptability of all recognized materials and types of construction. The work of these specialists must be placed in an enforceable form by those who, through years of actual experience, have learned what can be enforced.

The thought of uniformity together with standardization in building codes is of considerable importance from the standpoint of convenience and economy. Standardization of material and specifications are being adequately taken care of under the sponsorship of the American Standards Association and other authoritative national organizations. This simplifies the work of compilation and maintenance of the code. These standards assist in eliminating pet ideas and give to the code an authoritative basis beyond question.

"Police power," that indefinable and ever-changing rule, under which a building inspector obtains his authority, can only be fully sensed and understood by those who have used such authority and have thereby learned its limitations. "Police power" authority is based on the average mental standard of the general public, which is governed thereby. This fact precludes the possibility of enforcing a super-specification which may be considered correct by architects and engineers, or by others who might have pet ideas on construction. Only those provisions which are practical and effective, and which are based on fundamental principles of safety can be enforced.

The "Uniform Building Code" is primarily based on two phases of safety—fire and structural. It has not been found advisable to incorporate provisions covering the subjects of use-zoning or sanitation, or some of the other very specialized branches of the building industry, such as plumbing, electric wiring, or fire prevention ordinances dealing with maintenance and extreme hazards.

Improving building standards

The average mental standard of a city, state, or nation is always in a condition of change. Therefore, building code provisions which can be enforced at one time become obsolete and unenforceable for that reason, if for no other. One hundred and fifty years ago a man in planning to build a house would begin to prepare materials a year before he desired to begin actual construction operations. There was no thought of skimping in quality of materials, size of structural members, or thickness of walls. The main thought behind the project was that the structure should be large enough for all contemplated uses and that it should be permanent. Lime for the masonry was slaked over the entire period of the winter; the best quality of lumber was carefully cut and seasoned in the manner which the work implies; masonry foundations were laid of ample size and allowed to time-harden before the super-structure was placed; every joint in the structure was carefully made by men who could have put our present-day finishing carpenters to shame. If our modern codes could have been examined by the builders of those days, they would have been ridiculed as altogether inadequate and allowing too flimsy construction. Some of the buildings constructed by those craftsmen of other days are now

standing as a monument to their great skill and integrity.

Due to the continual and energetic pressure of our present-day builders, standards of construction have been lowered until now the average life of buildings, except the skeleton frame types, is not much over 15 years unless extensive maintenance is carried on. Before we were aware of it the standards of construction had been lowered beyond all reason, and we find it impossible to jump back up the ladder as fast as we came down. The raising of standards will have to be by a long and painstaking process of general tightening up of code provisions, enforcement, and education, in which all sections of the building industry will have to cooperate collectively through such organizations as the Pacific Coast Building Officials' Conference.

All too often the major thought behind code compilation and enforcement is economy and not reasonable use-life of the building. Code maintenance, if carried on by an individual city, is subject to the desires of the person or organization that can wield the greatest political pressure.

The Pacific Coast Building Officials' Conference, through its cooperative code compilation and maintenance work, has gone a considerable distance along the road toward improved building standards without raising the cost of building operations to any appreciable amount. The educational value of the Conference Research Department is also being felt and appreciated by members who are in search of information regarding new materials and types of construction. The effects of the efforts of the Conference is a reduction in the base insurance rates of the communities using the Code, an added confidence on the part of building financing organizations, and a satisfaction on the part of building owners, due to substantial construction.

A Uniform Building Code for the Municipalities of New England

by

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New England Building Officials' Conference

Ten general committees and forty-six subcommittees carry on code development work for oldest of building officials' organizations

An article on the subject of a Proposed Recommended Uniform Building Code for New England would be incomplete without a brief history of the organization sponsoring such a code; namely, the New England Building Officials Conference.

This Conference is the outgrowth of the Association of Massachusetts Building Inspectors, which was organized after a preliminary meeting held in Boston on April 29, 1913, and attended by representatives of twelve cities and towns in the State. The idea which prompted the forming of the organization was inadequacy, antiquity, and lack of uniformity of the several building laws in the Commonwealth.

It is interesting to note that as far as we have been able to ascertain, this was the first authentic meeting of any recognized group of building officials. The list has grown and now we find, in addition to the New England Building Officials Conference, organized in 1913, the Building Officials Conference of America, organized in 1914; the Pacific Coast Building Officials Conference, organized in 1922; the Building Officials Conference of Florida, organized in 1926; the Southeastern and Southwestern Building Officials Conference, both organized in 1929; the New Jersey Building Inspectors Association, date of organization not known; and the New York State Building Officials, organized in 1930.

In 1928, the membership of the Association of Massachusetts Building Inspectors had grown to 67, and it was proposed to increase the field of its activity to include the several New England States. Formal action was taken on this proposal at the annual meeting in 1929, and the name of the organization was changed to The New England Building Officials Conference. This action created a new interest in the membership, and brought to the attention of the city and town officials of New England the fact that their communities should be represented in the as-

[1] Building Commissioner, City of Boston; member of Sectional Committee on the Building Exits Code (A9-1929).

sociation. The membership immediately increased to 171, and has since grown to 272, representing the principal cities and towns in the six New England States.

Recognizing the great divergence, antiquity, and lack of uniformity of the existing building laws and codes of the many cities and towns of New England, and the great handicap thus imposed on the public interested in the construction and ownership of buildings, the New England Building Officials Conference early in 1929 set itself to the task of formulating a recommended uniform code which would be equally applicable to the conditions found in the large metropolitan centers and in the smaller cities and towns. It was felt that only thus could the public be assured of adequate safety in building construction at a minimum cost and that those interested in building; namely, the architect, the engineer, the building contractor, the building owner and manager, would be relieved of the confusion resulting from the multiplicity of conflicting laws in the various municipalities. Through the standardization of requirements for building materials and methods of construction, dealers in these commodities would be enabled to effect savings that would result in lowering the cost of construction.

Early in 1929 a committee was appointed by the New England Building Officials Conference known as the "Building Code Committee." Because of geographical reasons it was found very impractical to hold frequent meetings of this committee and it was thought advisable to appoint committees in several large cities, these committees to be known as "Regional Committees," and the result of their work to be reviewed by the "Building Code Committee" of the Conference. As work progressed it was deemed advisable to have the regional committee in Boston submit the reports of the various committees to a review committee, including the regional committees in other cities, for criticism and recommendation.

After a great deal of study by the Building Code Committee of the conference it was decided that the Regional Committee of Boston should be made up in the following manner:

For purposes of organization it was decided to divide the entire subject of building law into ten general parts, and a committee was appointed for each part. The chairman of each committee was a member of what is known as the Executive Committee.

To facilitate the work of the General Committees, 46 subcommittees were appointed with a chairman for each subcommittee.

In addition to these committees, which were appointed for a specific purpose, another committee known as the Advisory Committee, made up of men of national reputations in the building industry, was appointed. The function of this committee was to give advice to all subcommittees on any problem that was referred to them.

This Advisory Committee, together with the chairmen of the ten General Committees, the chairmen of the 46 subcommittees, and the Building Code Committee, constituted what was known as the Review Committee.

On receipt at headquarters of a report from any subcommittee, sufficient copies of that report were printed to supply each member of the entire Review Committee. After consideration and proper study of these reports, the members of the Review Committee sent in any additions, corrections, or criticisms that they deemed advisable. Such additions, corrections, or criticisms were forwarded back to the subcommittees for their consideration.

The complete line-up of the organization was as follows:

Advisory Committee—To be consulted by and to advise all subcommittees

Executive Committee—Chairmen of ten general Committees

Review Committee—To review and suggest changes in reports of all subcommittees

Advisory Committee
Executive Committee
Committee of Chairmen of 46 Subcommittees
Building Code Committee

General Committees—Ten

Committee 1. Administrative—Subcommittees (1) Title and Scope; (2) General Provisions; (3) Enforcement

Committee 2. Definitions—Subcommittee (4) Definitions

Committee 3. Requirements Based on Occupancy—Subcommittee (5) Classifications of All Buildings by Use or Occupancy and General; Subcommittees (6-15) Requirements for Groups A-J Buildings, respectively.

Committee 4. Requirements Based on Location in Fire Zone—Subcommittee (16) Restrictions in Fire Zone

Committee 5. Requirements Based on Types of Construction—Subcommittees (17) Classification of All Buildings by Types of Constructions; (18) Type 1 Buildings (Fireproof); (18 Prime) Type 2 Buildings (Fire Resistive); (19) Type 3 Buildings (Heavy Timber Construction); (20) Type 4 Buildings (Ordinary Masonry); (21) Type 5 Buildings (Metal Frame); (22) Type 6 Buildings (Wood Frame)

Committee 6. Engineering Regulations, Quality, and the Design of the Materials of Construction—Subcommittees (23) Live and Dead Loads; (24) Masonry (Quality and Design); (25) Wood (Quality and Design); (26) Reinforced Concrete (Quality and Design); (27) Steel and Iron (Quality and Design)

Committee 7. Detailed Regulations—Subcommittees (28) Excavations, Footings, and Foundations; (29) Walls and Partitions; (30) Enclosure of Vertical Openings; (31) Floor Construction (To Consult With Subcommittee 18

Prime); (32) Roof Construction and Covering; (33) Stairs, Ramps, and Smokeproof Towers; (34) Doors, Windows, and Skylights; (35) Bays and Balconies; (36) Penthouses and Roof Structures; (37) Chimneys and Heating Apparatus; (38) Fire Extinguishing Apparatus; (39) Stage Ventilators; (40) Motion Picture Machine Booths; (41) Proscenium Curtains

Committee 8. Fire-Restrictive Standards for Fire Protection—Subcommittees (42) General; (43) Fire Resistive Standards

Committee 9. Regulations for Use or Occupancy of Streets and Projections over Public Property—Subcommittees (44) Temporary Use of Streets During Construction; (45) Permanent Occupancy

Committee 10. Legislative—Subcommittee (46) Legislative

The public-spirited men on these committees labored diligently for three years, devoting unstintedly of their time, energy, and ability, frequently at great personal sacrifice, to the consideration of the various problems confronting them.

The result of these two years of effort, in which 216 meetings were recorded, was the report of the ten general committees and the 46 subcommittees which was printed in 1932, as a tentative draft of the proposed recommended Uniform Building Code for New England. A second draft was issued in 1933 with the additions and changes that had been made up to February of that year by the Executive Committee on recommendation of the Review Committee.

This entire year has been devoted to a general review of the work of all the committees by the Executive Committee. These meetings of the Executive Committee have been attended by the chairmen of the different subcommittees whose work is being reviewed, as well as any person who is not in full accord with the report of the subcommittee. At the present time the Executive Committee is reviewing the work of Subcommittee No. 26 on Reinforced Concrete, Quality and Design. It is the hope of the committee that the review of the entire Building Code will be in such shape that it may be introduced in the Massachusetts Legislature for the coming year for enactment as the Building Law of the City of Boston.

Further revision and improvement of this tentative code will undoubtedly be found necessary or advisable. Therefore, suggestions, recommendations, and criticisms, looking to its improvement, will be gratefully received. The New England Building Officials Conference is confident that the proposed recommended code will not only redound to the advantage of the building industry itself and its allied crafts, but will also provide additional safeguards for the general public against faulty construction or materials, will protect the public against needless hazards to life and health, will reduce costs by standardizing practices, will protect investors and property owners against inferior design and construction, and will promote the general welfare of every community wherein the code may be adopted.

The energies of the New England Building Officials Conference so far have been directed in what we are pleased to term an activity for the benefit of the public, and we are trying to convince them that we are deserving of their support. These activities include the dissemination of knowledge incidental to the proper construction and safeguarding of buildings and the enactment and enforcement of proper building laws, the acquainting of the public with the duties and responsibilities of the building inspector, and the promoting of harmonious relations and constructive cooperation between these officials, architects, engineers, material dealers, contractors, and the general public.

The New England Building Officials Conference has performed a good work for the cities and towns of New England, if for no other reason than that through the interchange of ideas we are increasing our own efficiency and making better officials of the members of our conference.

Undoubtedly this is true in other parts of the country, as shown by the number of building officials' organizations named above, and we strongly recommend that building officials in every state or group of states in this entire country be organized.

The officers and members of the New England Building Officials Conference, take this opportunity, in our twentieth year as an organization, to extend our greetings to all other building officials' organizations in the United States and Canada. It is our sincere wish that you carry on your work with the same vigor as in the past, enlarging your scope and activities from year to year, adopting our slogan of "Better Buildings and Better Building Laws."

Symposium on Motor Lubricants

Seven technical papers, together with extensive discussion, constituting a Symposium on Motor Lubricants, have been published by the American Society for Testing Materials. The symposium, presented at a joint meeting of the A.S.T.M. and the Metropolitan Section of the Society of Automotive Engineers last March, includes papers dealing with service requirements, viscosity, carbon deposits, oil consumption, service changes, engine design as affecting oil performance, and related topics.

Copies of the symposium are available from the American Society for Testing Materials, 1315 Spruce Street, Philadelphia, or from the ASA at $1.25.

International Meeting on Petroleum Products

by

R. P. Anderson,[1]
ASA Representative

Committee 28 on Nomenclature and Methods of Test of Petroleum Products of the International Federation of National Standardizing Associations held its first meeting on Saturday, July 22, 1933, at the Imperial Institute of Science and Technology, London, in connection with the World Petroleum Congress sponsored by The Institution of Petroleum Technologists.

Austria, Belgium, Denmark, France, Germany, Great Britain, Italy, Japan, Poland, Sweden, and the United States were represented, the total number of individuals present being 46.

The secretariat of Committee ISA 28 has been assigned to the American Standards Association. The writer, having been delegated by the American Standards Association to act as its representative on the international committee, officiated as chairman of the meeting supported by John Gaillard of the American Standards Association and A. Huber-Ruf, General Secretary of the International Standards Association.

The meeting was primarily one of organization. After the standard methods of each of the cooperating countries have been distributed to the others and there has been an opportunity for correlation, suggestions will be sent to the secretariat for the future program of work of the committee. Plans were made for setting up a vocabulary of terms used in the various countries.

Discussion of developments in various countries in measuring the anti-knock value of motor fuels brought out the need for the extension of the cooperative effort on this topic and this will be put into effect.

A brief discussion of the problem of expressing viscosity brought out a substantial unanimity of opinion that viscosity should be expressed in absolute units.

An important result of the discussions at London was the crystallization of a growing sentiment, as also embodied in a resolution indorsed at the final session of the Congress, that matters pertaining to international uniformity of test methods should be referred to ISA 28. This appears entirely logical inasmuch as the ISA is a federation of various national standardizing bodies in which the standardization movement in the respective countries centers.

[1] American Petroleum Institute, New York; secretary, Sectional Committee on Methods of Testing Petroleum Products and Lubricants (Z11); member of Sectional Committee on Scheme for the Identification of Piping Systems (A13).

Engineers Added to ASA Staff for Commercial Standards Work

George Schuster, for the past six years simplification specialist of the Division of Simplified Practice, National Bureau of Standards, and Harry B. Houghton, for the past five years on the staff of the Department of Commerce Building Code Committee,

George Schuster

H. B. Houghton

have been appointed members of the ASA staff. For the time being they are making their headquarters at the Bureau of Standards. Mr. Schuster will concentrate on projects in the Division of Simplified Practice, particularly on those which are most in need of early attention during the present transition period. Mr. Houghton will work on a projected conference on building and plumbing codes which will be held under the auspices of the Building Code Committee and the ASA, and which will lay the foundation for the transfer of the administration of the Building Code Committee to the ASA.

During the six years that Mr. Schuster was a member of the staff of the Division of Simplified Practice, he assisted various industries in developing 31 simplified practice recommendations. Mr. Schuster was graduated from the University of Illinois with the degree of B.S.M.E. Since that time he has been assistant to the engineer of tests and in charge of the Testing Laboratory of the Atchison, Topeka, and Santa Fe Railway Company, Topeka, Kansas; he served as captain in the Ordnance Department during the War, in automotive work and also in

connection with the development of self-propelled gun carriages in France; he was assistant to the chief of the Automotive Section of the Ordnance Department as civilian automotive engineer following discharge from the Army; and was in charge of the testing of heavy ordnance automotive equipment at Aberdeen Proving Ground for a time, until he transferred to the Division of Simplified Practice.

Mr. Houghton was graduated from the University of Vermont with the degree of B.S.C.E. Since his graduation he has been structural draftsman of the Vermont State Highway Department; assistant engineer with the Office of Public Buildings and Parks of the National Capital; surveyor with the Panama Canal Commission; and since 1928 a member of the staff of the Department of Commerce Building Code Committee.

Delft Institute Awards Degree to John Gaillard

John Gaillard, mechanical engineer on the staff of the American Standards Association, has just been awarded the degree of Doctor of Technical Science by the Technische Hoogeschool (Institute of Technology) of Delft, Holland, where he was graduated as a mechanical engineer before he moved to the United States and became an American citizen.

The award followed the submission of a thesis entitled "The Fundamentals of Industrial Standardization and Its Practical Application, Especially in the Mechanical Field." The thesis, among other things, traces the development of standardization in the course of human history, analyzes its essential functions, formulates a general definition of standardization, discusses the extent of its present application in the United States, and reviews the organization of standardization work in a manufacturing concern in the mechanical industry.

Publish Illuminating Nomenclature and Photometric Standards

The revised edition of the American Standard Illuminating Engineering Nomenclature and Photometric Standards (Z7-1932), approved by the American Standards Association in December, 1932, has been published by the Illuminating Engineering Society, sponsor for the project. The standard may be purchased from the Illuminating Engineering Society, 29 West 39 Street, New York, or from the American Standards Association at 15 cents each.

State Officials Seek Safety Clause in All Industrial Codes

A sweeping proposal, aimed to safeguard the safety and health of workers in all industries, has been made to the National Recovery Administration by the heads of state industrial commissions and labor departments. The proposal, made by a joint convention of the national associations of these officials in Chicago on September 14, would have a clause written into every industrial recovery code requiring compliance with state safety and health regulations and with the national safety codes approved by the American Standards Association.

Adoption of this proposal would, in the opinion of leaders in the safety movement, have almost as far-reaching effects in eliminating preventable accidents and unnecessary health hazards as the child labor clause of the industrial codes is having in eliminating child labor. It is pointed out that there are over 20,000 accidental deaths in industry each year and more than a million injuries costing industry and the public more than $500,000,000 annually. A large percentage of this terrific loss is needless and could be eliminated. Human and economic losses of almost equal magnitude result from the failure to provide adequate hygienic safeguards against dust, poison, and other health hazards.

The proposal of the state officials, made in the form of a resolution, follows:

RESOLVED by the International Association of Industrial Accident Boards and Commissions and the Association of Governmental Officials in Industry in joint convention that it be recommended to the National Recovery Administration that some such clause as the following be included in each of the industrial codes:

> "Every employer coming under the jurisdiction of this code shall comply with all safety and health laws and regulations of the State in which the work place is located. In all occupations in which workmen are not protected by such State laws or regulations, the employer shall comply with provisions of any Standard Safety Code approved by the American Standards Association, which provides protection against any hazard encountered in such occupations."

RESOLVED, That a copy of this resolution be transmitted to General Hugh S. Johnson, Administrator of the National Industrial Recovery Act.

ASA PROJECTS

The National Electrical Code 1933 Revised Edition

by
A. R. Small,[1] *Chairman*
Sectional Committee

The forthcoming, 1933, edition of the National Electrical Code is the seventeenth formal publication of revisions to the original Code, first published in 1897. It is the sixth revision since that of 1920 when the term "Approved American Standard" was first employed. This brief record emphasizes how flexible rather than static some standards must be if they properly register the state of the art for the industry or product affected.

The previous edition of the Code as published by the National Board of Fire Underwriters had the "effective date" of November, 1931. Similarly, its 1933 edition will announce November 1 as the "effective date." Hence, although seven months have elapsed since the meeting of the sectional committee when the revision was discussed and agreed upon, the new material and other changes reflect the developments in practice in installing electric wiring and apparatus for light, heat, and power during a preceding two-year period.

It is said that the National Electrical Code, verbatim or modified, is the basic formula for official legal wiring installation regulations in more than 2200 communities and of a like number of enforcing authorities. In some areas the current edition is adopted by title. On this account, at least in part, the editorial form and arrangement of the Code's text remains as it has been since the edition of ten years ago. In an endeavor to have throughout a consistent editorial style, many minor changes in punctuation and phraseology are made at the time of each revision. These are not intended to affect the substance and are not further discussed herein. It is perhaps inevitable that there will be many such minor items because of the working plan of the Electrical Committee. This plan is to have each chapter or article assigned to a subcommittee, the report of which is received and acted upon more or less independently (almost) of the reports from the other article committees. Experience has shown that oversights in correlating related provisions in separate articles cannot be entirely avoided.

The following mention of major changes appearing in the new text records the writer's views. Others may place entirely different values upon various items whether mentioned or ignored herein. Doubtless, as heretofore, matters of seeming present great importance (and sometimes extremely controversial) take a normal aspect in the perspective of a year or two of field experience in the application of the Code as a whole.

Article 1: Definitions—a number of changes were made so as to secure conformity with the new proposed American Standard Definitions of Electrical Terms, ASA Project C42.

Article 4: Services and Service Equipment—a multiple tenant building may now have more than a single set of service conductors and service equipment. The omission of insulation on grounded neutral service conductors is permitted for a greater variety of conditions, first recognition of this practice having been recorded in the 1931 text. Similarly, the limitations upon the use of unfused meters placed ahead of the service switch are relaxed somewhat.

In *Article 6, Conductors,* provision is made for a flame-retarding as well as a moisture-proof finish on single conductor circuit wires.

A new type of so-called non-tamperable plug fuse is recognized in *Article 8, Automatic Overcurrent Protection of Circuits and Appliances.*

The regulations for protective *Grounding* in *Article 9* are completely rewritten with substantial improvement editorially. The technical changes include wider permitted use of artificial grounding electrodes and, with certain restrictions, the interconnection of a distribution primary lightning arrester grounding conductor with a grounded neutral service conductor.

Article 20: Wiring Installation Design—is a new

[1] Vice President, Underwriters' Laboratories; chairman, Electrical Committee, National Fire Protection Association.

chapter. Much of its text is lifted from other articles of the previous edition. It seeks to treat of the problem of adequacy of wiring and outlets. It is not settled just when requirements seeking to obtain adequacy for expected future use are beyond the police power. The new provisions are most conservatively stated, partly with this doubt in mind.

Article 41: Emergency Lighting—is likewise new. Provisions, formerly in Article 36, for theatres and the like, have been transferred and a general treatment of the problem of emergency and exit lighting (electrically) is worked out.

Much of the change in *Article 50: Circuits and Equipment Operating at More Than 600 Volts*—is because of transfer of former text to the chapter on Signs and Outline Lighting and to the new Article 51 on X-Ray and High-Frequency Apparatus. For power circuits the recognized use of high-voltage fuses has been extended. Clearances, both horizontal and vertical, above floors and from working spaces, of live parts at various voltages now appear in table form.

Originally covering chiefly the fire hazard, the National Electrical Code soon became a criterion of acceptable wiring installation methods. A large number of its current provisions register standards of practice more or less remote from imminent fire danger although new-work factors of safety will quickly lessen with lack of appropriate maintenance. During recent years the personal injury hazard has had increasing consideration. The 1933 National Electrical Code includes substantially all safeguards to wiring in users' premises that are generally advocated or recognized for both the fire and the shock hazards.

ASA Approves Methods of Testing Petroleum Products

Under the project for Methods of Testing Petroleum Products and Lubricants (Z11), the American Standards Association recently approved one new American Standard, revisions of four existing American Standards, and one American Tentative Standard, and also the advancement of two American Tentative Standards to the status of American Standard. This action followed the endorsement and submittal to the ASA by the sponsor (the American Society for Testing Materials) of recommendations from the Sectional Committee on Methods of Testing Petroleum Products and Lubricants (Z11) concerning standards developed by A.S.T.M. Committee D-2. This A.S.T.M. committee is identical in personnel with the sectional committee.

Approval as American Standard with the designation of Z11.31-1933 was given to Methods of Test for Gravity of Petroleum Products by Means of a Hydrometer (A.S.T.M. D287-33).

The titles and designations of the revised methods of test (four approved as American Standard and the fifth as American Tentative Standard) are as follows:

Sulfur in Petroleum Oils Heavier than Illuminating Oil (Z11.13-1933) (A.S.T.M. D129-33)

Cloud and Pour Points (Z11.5-1933) (A.S.T.M. D97-33)

Flash and Fire Points by Means of Open Cup (Z11.6-1933) (A.S.T.M. D92-33)

Viscosity of Petroleum Products and Lubricants (Z11.2-1933) (A.S.T.M. D88-33)

Penetration of Greases and Petrolatum (Z11.3-1933) (A.S.T.M. D217-33T)

The methods of test advanced from American Tentative Standard to American Standard are:

Dilution of Crankcase Oils (Z11.29-1933) (A.S.T.M. D91-33)

Precipitation Number of Lubricating Oils (Z11.30-1933) (A.S.T.M. D91-33)

Copies of the recently approved standards are available from the American Society for Testing Materials or from the ASA office at 25 cents each.

The American Society for Testing Materials recently published the *Report of Committee D-2 on Petroleum Products and Lubricants and Methods of Test Relating to Petroleum Products* which includes, among the 51 standards the 31 methods of test for petroleum products and lubricants which have been approved by the American Standards Association.

The report, a volume of 292 pages, covers the activities of Committee D-2 for the past year and also includes the complete text of the standards for testing petroleum and its products. Of the 51 methods of test published, 37 have been adopted by the A.S.T.M. as standard and 14 as tentative standard. Three American Standards for testing bituminous materials, as well as the A.S.T.M. standards or tentative standards for testing bituminous materials and electrical insulating oils, are also included.

Copies of the report may be purchased from the American Society for Testing Materials, 1315 Spruce Street, Philadelphia, or may be purchased or borrowed from the American Standards Association. The price is $1.25 per copy.

ASA Approves Standard for Zinc Coatings on Steel

The American Standards Association has approved, as American Standard, the Specifications for Zinc (Hot-Galvanized) Coatings on Structural Steel Shapes, Plates, and Bars and Their Products (G8.1-1933) (A.S.T.M. A123-33). This standard is a revision of the American Tentative Standard approved in 1931, and was submitted by the American Society for Testing Materials with its endorsement as sponsor, following the recommendations of the sectional committee (G8).

The revisions bring the standard specifications into accord with the results of an investigation into the embrittlement of structural steel recently conducted at the Battelle Memorial Institute. Certain steps in the manufacturing of galvanized products which require careful attention in order to avoid an embrittled product are pointed out for the first time in the report of this research. The revision of the standard specifications takes cognizance of the fact that the report has now made it possible to avoid injurious embrittlement of the product.

The report of the investigation, which was conducted under the direction of the A.S.T.M. Committee A-5 on Corrosion of Iron and Steel, and of groups representing certain public utilities, following a request from the Sectional Committee on Zinc Coatings for Iron and Steel (G8), was reviewed in INDUSTRIAL STANDARDIZATION for December, 1932 (page 313). The report has been published and may be purchased from the A.S.T.M., 1315 Spruce Street, Philadelphia, Pa., or from the American Standards Association, at $1.00 a copy.

The revised standard is being printed and copies will be available at 25 cents each from the A.S.T.M. or from the ASA.

ASA Approves Revised Methods of Analysis

Revisions of three American Standards covering Methods of Laboratory Analysis have been approved by recent action of the ASA Standards Council. The standards with their designations are as follows:

Methods of Routine Analysis of White Pigments (K15-1933) (A.S.T.M. D34-33)

Methods of Routine Analysis of Dry Red Lead (K16-1933) (A.S.T.M. D49-33)

Methods of Laboratory Sampling and Analysis of Coal and Coke (K18-1933) (A.S.T.M. D271-33)

In the standards for Methods of Analysis of White Pigments the revisions consist of the addition of a new paragraph on treatment of sample, a replacement procedure for basic sulfate of lead, and the modification of procedure for zinc oxide. In the case of the Methods of Analysis of Dry Red Lead the revision comprises the addition of a section on treatment of sample. Both of these revisions, prior to their adoption, had been published as tentative.

The revised standard for Methods of Laboratory Sampling and Analysis of Coal and Coke now contains an alternative procedure for laboratory sampling of coal. This alternative procedure, commonly called the ball-mill method, has been in use in the laboratories of the U. S. Bureau of Mines for several years and was published as tentative by the Society in 1932 on the recommendation of A.S.T.M. Committee D-5 on Coal and Coke.

Revisions in American Standards Under Consideration

The American Society for Testing Materials, in its capacity of sponsor, recently advised the ASA office that editorial changes to clarify the wording have been made in Standard Methods of Chemical Analysis of Manganese Bronze (K3-1931) (A.S.T.M. B 27-19) and in Section 11 of the Tentative Method of Test for Penetration of Greases and Petrolatum (Z11.3-1933) (A.S.T.M. D 217-33 T).

The Society also advised that certain proposed changes in the Methods of Test for Cloud and Pour Points (Z11.5-1933) (A.S.T.M. D 97-33) and in Methods of Test for Flash Point of Volatile Flammable Liquids (Z11.24-1932) (A.S.T.M. D 56-21) are being published as tentative. These proposed changes are being published for information only, and the ASA will be advised in due course if further action is contemplated.

American Standard for Blooms, Billets, and Slabs

Specifications for Carbon-Steel and Alloy-Steel Blooms, Billets, and Slabs for Forgings (G9.1-1933) (A.S.T.M. A17-29) have recently been approved as American Standard under the proprietary sponsorship method. A previous edition of these specifications was approved as American Tentative Standard in 1924 and the document recently approved was a revision prepared by the Society, as a result of several years of study, to maintain these specifications current with technical developments.